

Seeing Through the Basement to a New Exploration Frontier in the Southern Colombian Andes

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The Acevedo Block, in the Upper Magdalena Basin of the southern Colombian Andes, exposes a structural trough of Tertiary sediments between northwest-verging and southeast-verging thrust sheets of volcanic and metamorphic basement rocks. The southeast-verging Acevedo Thrust, observed on seismic data to dip at about 20-30° northwest, carries a thick succession of Triassic-Jurassic andesitic rocks. The northwest-verging Garzon, Suaza, and Tijina thrusts dip southeast at about 20-30° and carry Proterozoic granulites, Lower Paleozoic schists, meta-cherts and calcsilicates, Middle to Upper Paleozoic marine sedimentary rocks, and Triassic-Jurassic andesitic rocks. Both sets of thrusts cut coarse alluvial deposits of Late Miocene and Pliocene age and were therefore active during the regional Andean deformation, driven by collision of the Panama arc with northwestern South America.

In the subsurface the Tertiary and Cretaceous strata are observed to reach aggregate thicknesses in the range of 3 to 6 kilometres. Given the regionally low to moderate geothermal gradients, significant volumes of oil-prone Cretaceous source rocks beneath the valley should lie within the oil window. Potential reservoir targets are Lower Cretaceous fluvial to shallow marine sandstones, Upper Cretaceous deltaic sandstones and shallow marine limestones, as well as Paleogene terrigenous sandstones. The promise of the area is highlighted by the occurrence of numerous oil seeps in the valley along the thrust fronts. We are investigating the potential for subthrust traps up-dip of the oil kitchen with a high-resolution 2D swath seismic survey.